

## Chemical Force Affected by Dilution 285

version of the current took place.<sup>1</sup> In 1828 De la Rive carried these and similar cases much further, especially in voltaic combinations of copper and iron with lead.<sup>2</sup> In 1827 Becquerel<sup>3</sup> experimented with one metal, copper, plunged at its two extremities into a solution of the same substance (salt) of different strengths; and in 1828 De la Rive<sup>4</sup> made many such experiments with one metal and a fluid in different states of dilution, which I think of very great importance.

958. The argument derivable from effects of this kind appeared to me so strong that I worked out the facts to some extent, and think the general results well worthy of statement. Dilution is the circumstance which most generally exalts the existing action, but how such a circumstance should increase the electromotive force of *mere contact* did not seem evident to me, without *assuming*, as before (862), exactly those influences at the points of contact in the various cases which the prior results, ascertained by experiments, would require.

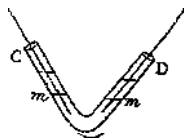


Fig 73-

Fig. 72.

959. The form of apparatus used was the bent tube already described (903), fig. 70. The precautions before directed with the wires, tube, etc., were here likewise needful. But there were others also requisite, consequent upon the current produced by combination of water with acid, an effect which has been described long since by Becquerel,<sup>5</sup> but whose influence in the present researches requires explanation.

960. Figs. 72 and 73 represent the two arrangements of fluids used, the part below *m* in the tubes being strong acid, and that above diluted. If the fluid was nitric acid and the platinum wires as in the figures, drawing the end of the wire *D* upwards above *m*, or depressing it from above *m* downwards, caused great changes at the galvanometer; but if they were preserved quiet at any place, then the electro-current ceased, or very nearly so. Whenever the current existed it was from the weak to the strong acid through the liquid.

<sup>1</sup> *Annales de Chimie*, 1823, xxii. p. 361.

<sup>2</sup> *Ibid.* 1828,

xxxvii. p. 234.

<sup>3</sup> *Ibid.* 1827, xxxv. p. 120.

<sup>4</sup> *Ibid.* 1828, xxxvii. pp. 240,

241.

<sup>5</sup> *Tratie de l'Electricite*, ii. p. 81.